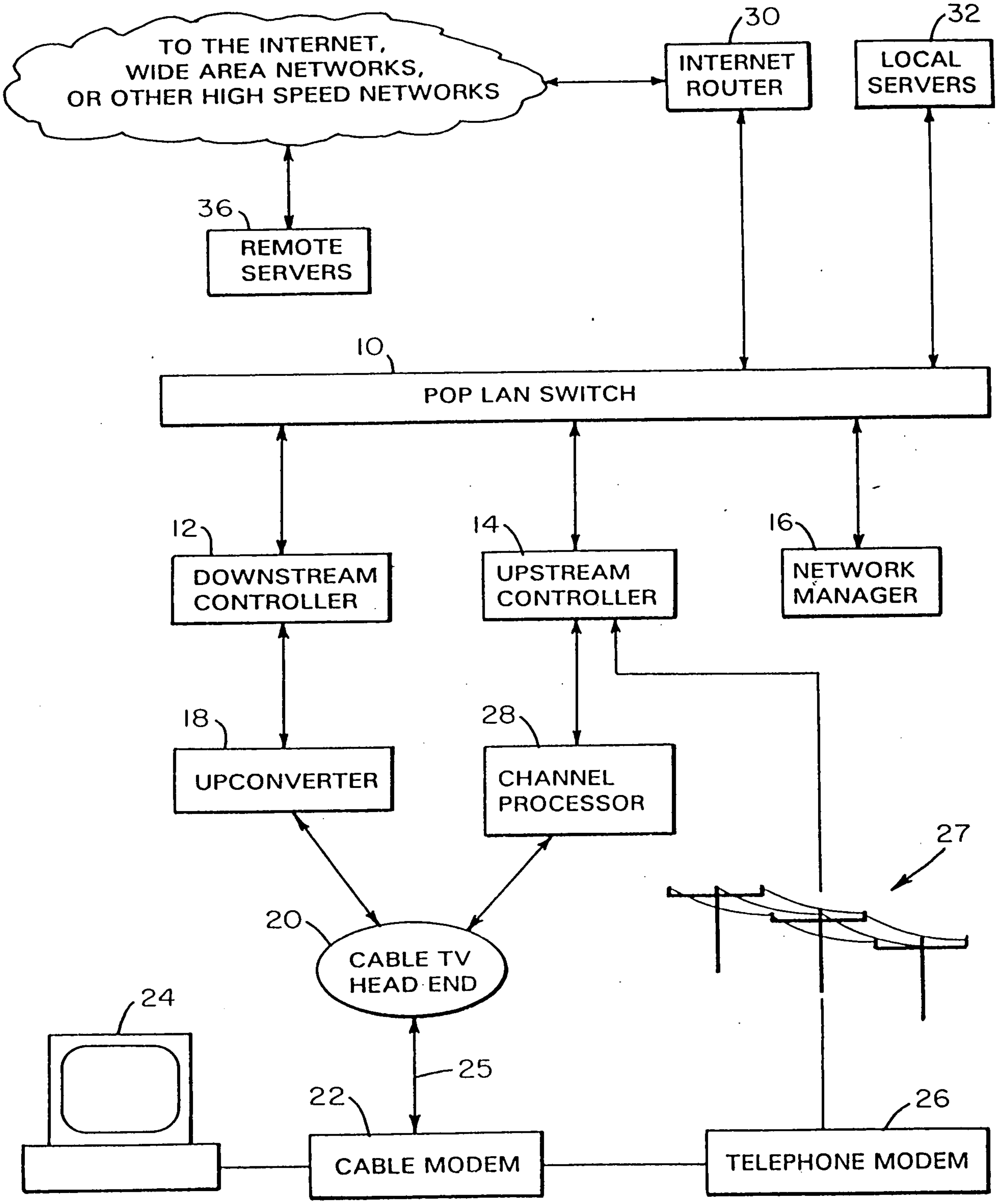
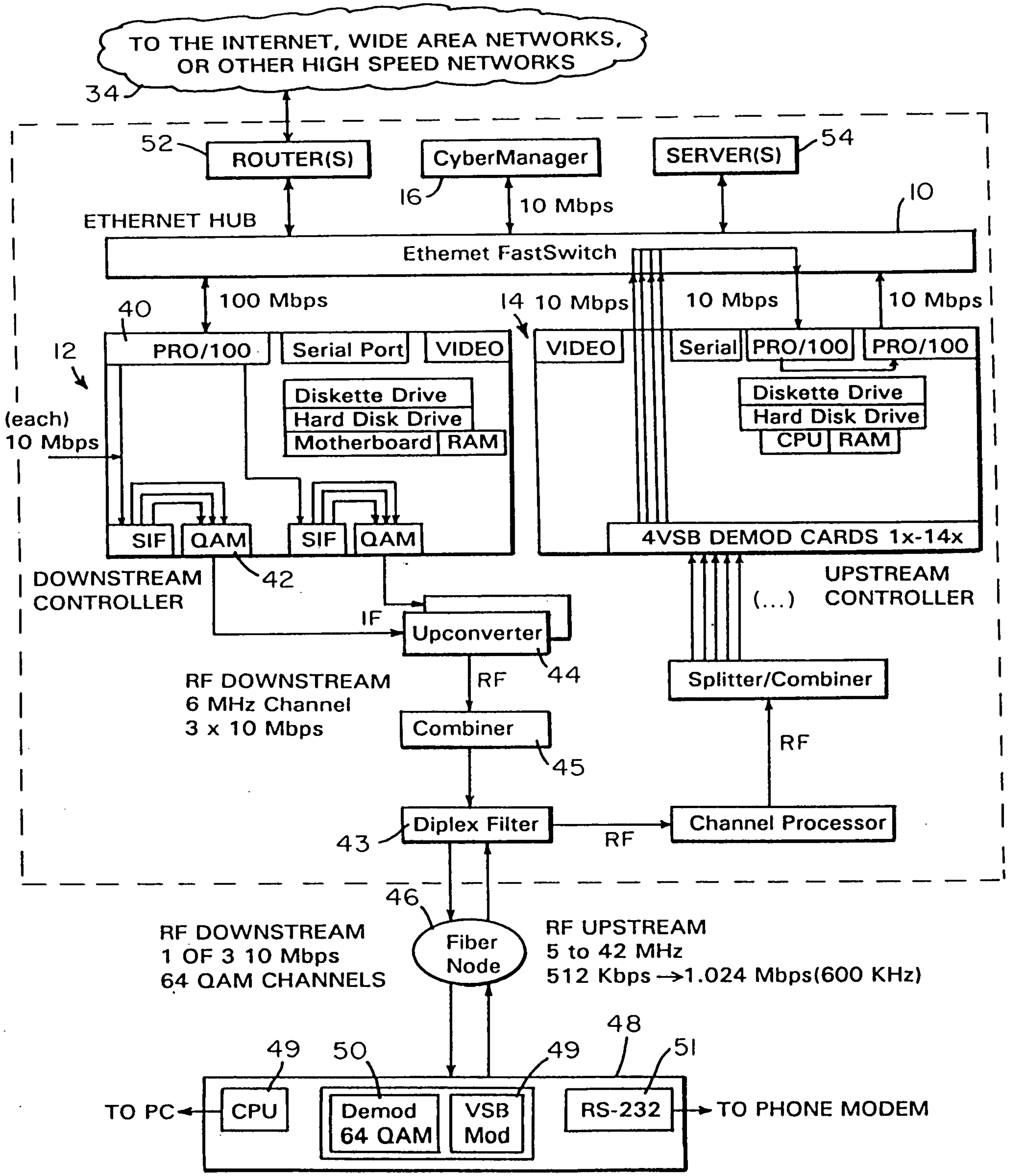

TO THE INTERNET, WIDE AREA NETWORKS, OR OTHER HIGH SPEED NETWORKS
30
INTERNET ROUTER
32
LOCAL SERVERS
36
REMOTE SERVERS
10
POP LAN SWITCH
12
DOWNSTREAM CONTROLLER
14
UPSTREAM CONTROLLER
16
NETWORK MANAGER
18
UPCONVERTER
28
CHANNEL PROCESSOR
27
20
CABLE TV HEAD END
24
25
22
CABLE MODEM
26
TELEPHONE MODEM

FIG. 1



TO THE INTERNET, WIDE AREA NETWORKS, OR OTHER HIGH SPEED NETWORKS
34
52
ROUTER(S)
CyberManager
16
SERVER(S)
54
10 Mbps
10
ETHERNET HUB
Ethemet FastSwitch
100 Mbps
40
14
10 Mbps
10 Mbps
10 Mbps
12
PRO/100
Serial Port
VIDEO
VIDEO
Serial
PRO/100
PRO/100
(each)
10 Mbps
Diskette Drive
Hard Disk Drive
Motherboard
RAM
Diskette Drive
Hard Disk Drive
CPU
RAM
SIF
QAM
SIF
QAM
4VSB DEMOD CARDS 1x-14x
DOWNSTREAM CONTROLLER
42
UPSTREAM CONTROLLER
(...)
IF
Upconverter
44
RF
RF DOWNSTREAM
6 MHz Channel
3 x 10 Mbps
Combiner
45
Splitter/Combiner
RF
Diplex Filter
43
RF
Channel Processor
46
Fiber Node
RF DOWNSTREAM
1 OF 3 10 Mbps
64 QAM CHANNELS
RF UPSTREAM
5 to 42 MHz
512 Kbps →1.024 Mbps(600 KHz)
48
49
50
49
51
TO PC
CPU
Demod 64 QAM
VSB Mod
RS-232
TO PHONE MODEM

FIG. 2

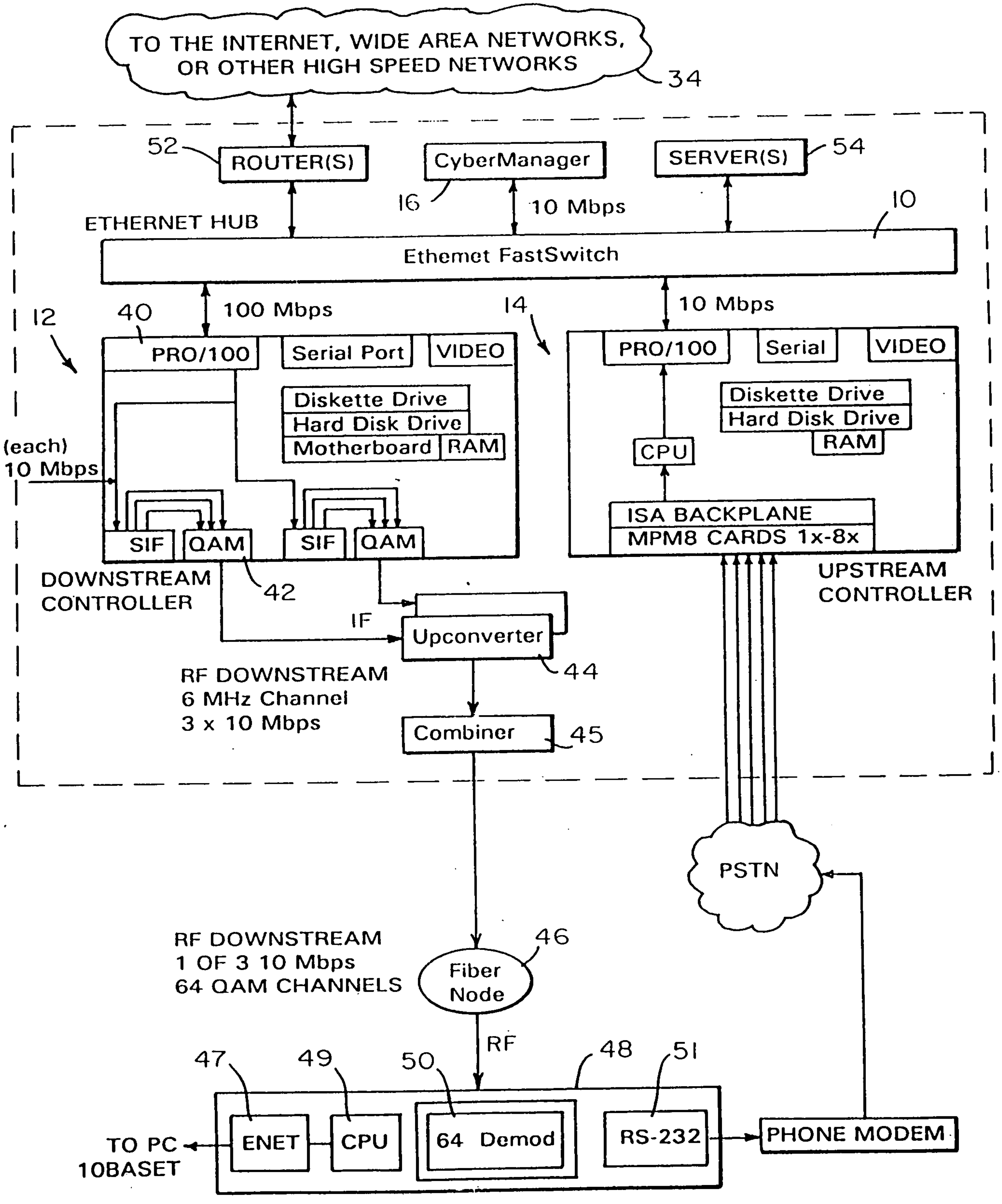

TO THE INTERNET, WIDE AREA NETWORKS, OR OTHER HIGH SPEED NETWORKS
34
52
ROUTER(S)
CyberManager
SERVER(S)
54
16
10 Mbps
10
ETHERNET HUB
Ethemet FastSwitch
12
40
100 Mbps
14
10 Mbps
PRO/100
Serial Port
VIDEO
PRO/100
Serial
VIDEO
Diskette Drive
Hard Disk Drive
Motherboard
RAM
Diskette Drive
Hard Disk Drive
RAM
CPU
(each)
10 Mbps
ISA BACKPLANE
MPM8 CARDS 1x-8x
SIF
QAM
SIF
QAM
DOWNSTREAM CONTROLLER
42
UPSTREAM CONTROLLER
IF
Upconverter
44
RF DOWNSTREAM
6 MHz Channel
3 x 10 Mbps
Combiner
45
PSTN
RF DOWNSTREAM
1 OF 3 10 Mbps
64 QAM CHANNELS
46
Fiber Node
RF
47
49
50
48
51
TO PC
10BASET
ENET
CPU
64 Demod
RS-232
PHONE MODEM

FIG. 3

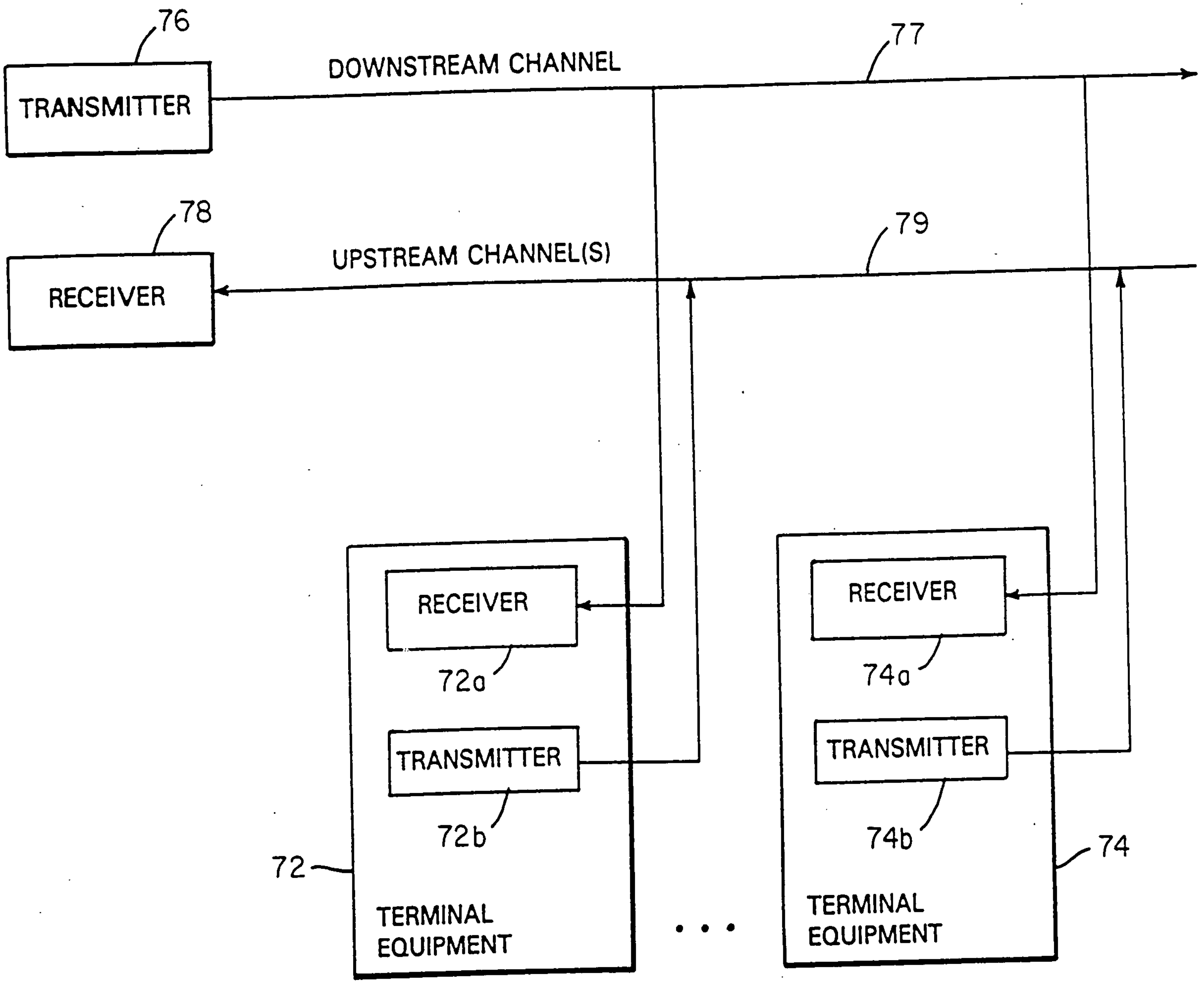

76
TRANSMITTER
77
DOWNSTREAM CHANNEL
78
RECEIVER
79
UPSTREAM CHANNEL(S)
RECEIVER
72a
TRANSMITTER
72b
72
TERMINAL EQUIPMENT
. . .
RECEIVER
74a
TRANSMITTER
74b
74
TERMINAL EQUIPMENT

FIG. 4A

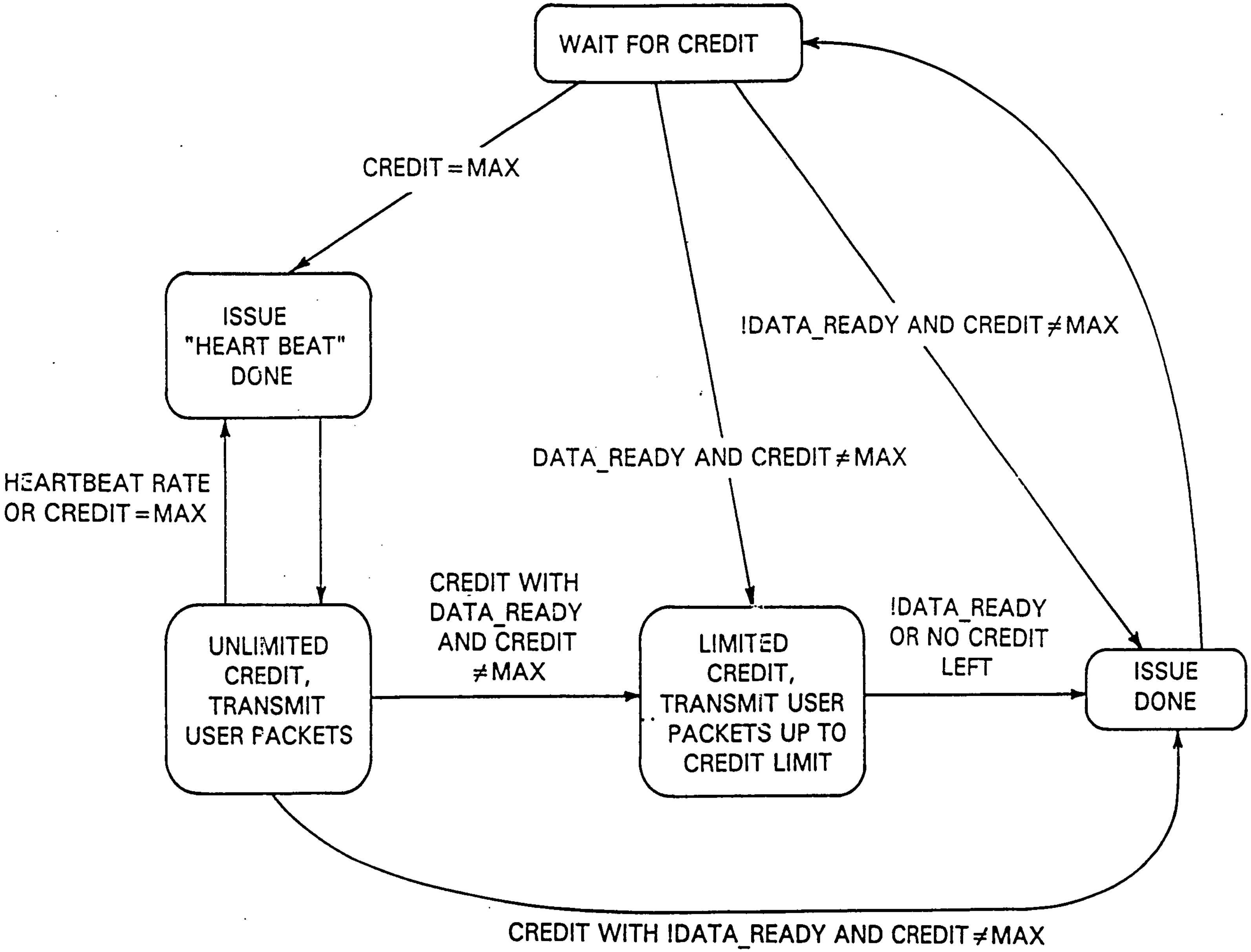

WAIT FOR CREDIT
CREDIT = MAX
ISSUE "HEART BEAT" DONE
HEARTBEAT RATE OR CREDIT = MAX
DATA_READY AND CREDIT ≠ MAX
!DATA_READY AND CREDIT ≠ MAX
UNLIMITED CREDIT, TRANSMIT USER PACKETS
CREDIT WITH DATA_READY AND CREDIT ≠ MAX
LIMITED CREDIT, TRANSMIT USER PACKETS UP TO CREDIT LIMIT
!DATA_READY OR NO CREDIT LEFT
ISSUE DONE
CREDIT WITH !DATA_READY AND CREDIT ≠ MAX

FIG. 4B

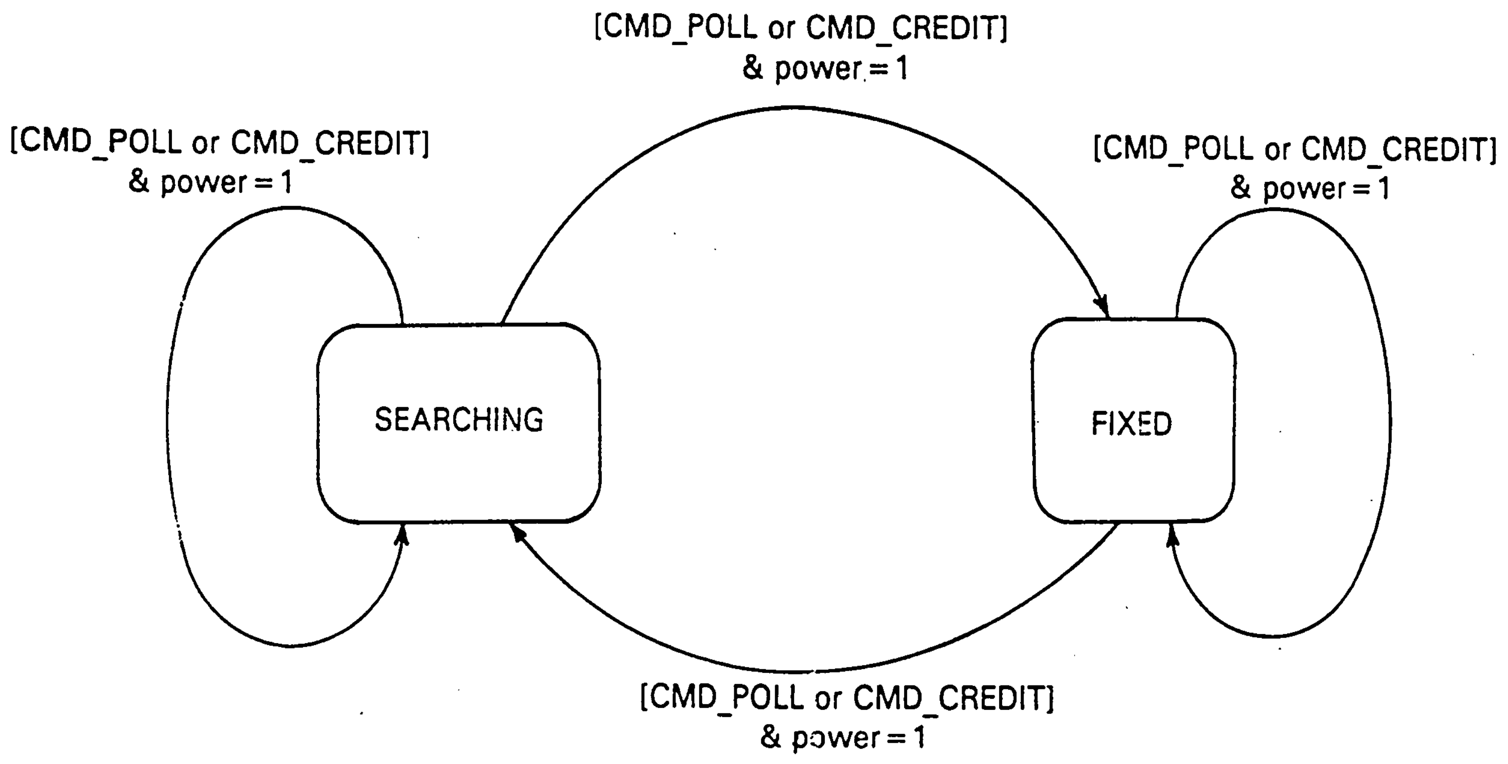

[CMD_POLL or CMD_CREDIT]
& power = 1
[CMD_POLL or CMD_CREDIT]
& power = 1
[CMD_POLL or CMD_CREDIT]
& power = 1
SEARCHING
FIXED
[CMD_POLL or CMD_CREDIT]
& power = 1

FIG. 4C

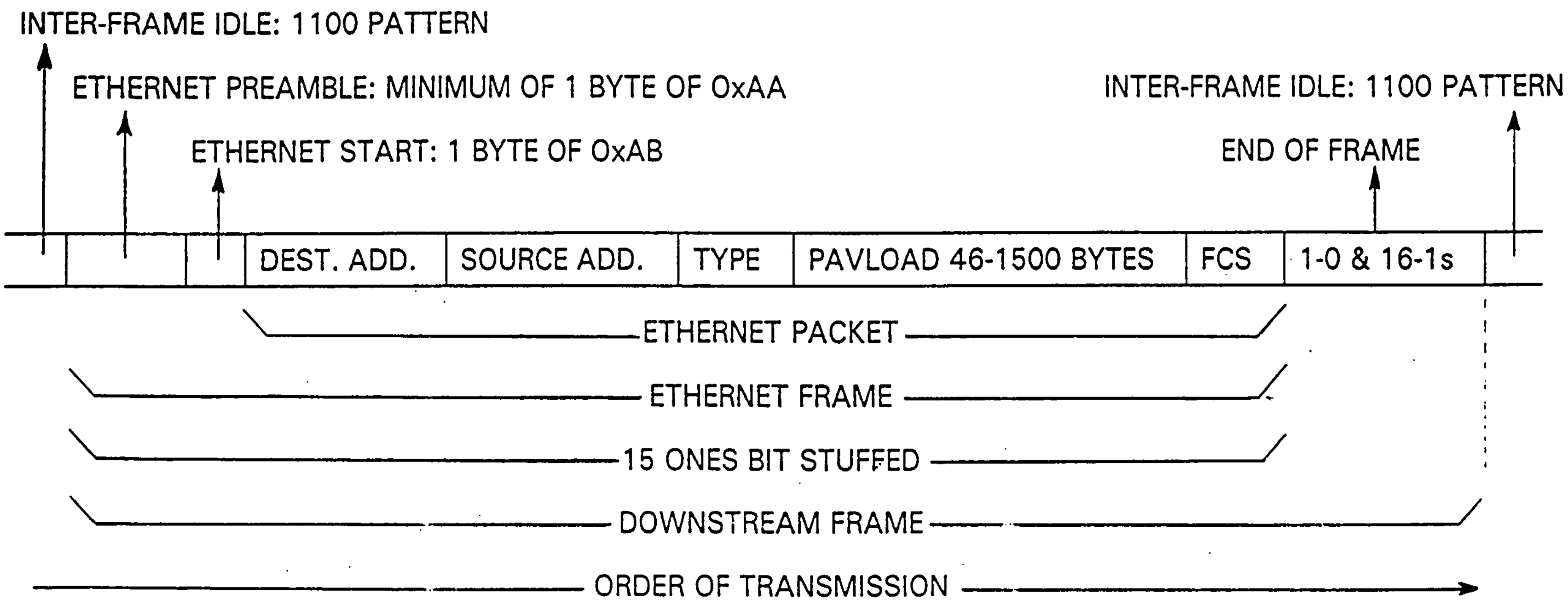

INTER-FRAME IDLE: 1100 PATTERN
ETHERNET PREAMBLE: MINIMUM OF 1 BYTE OF OxAA
ETHERNET START: 1 BYTE OF OxAB
INTER-FRAME IDLE: 1100 PATTERN
END OF FRAME
DEST. ADD.
SOURCE ADD.
TYPE
PAVLOAD 46-1500 BYTES
FCS
1-0 & 16-1s
ETHERNET PACKET
ETHERNET FRAME
15 ONES BIT STUFFED
DOWNSTREAM FRAME
ORDER OF TRANSMISSION

FIG. 4D

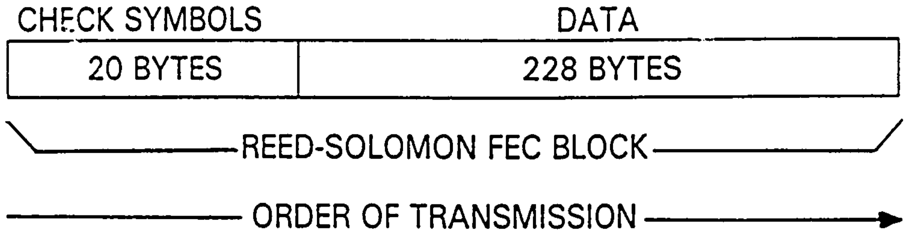
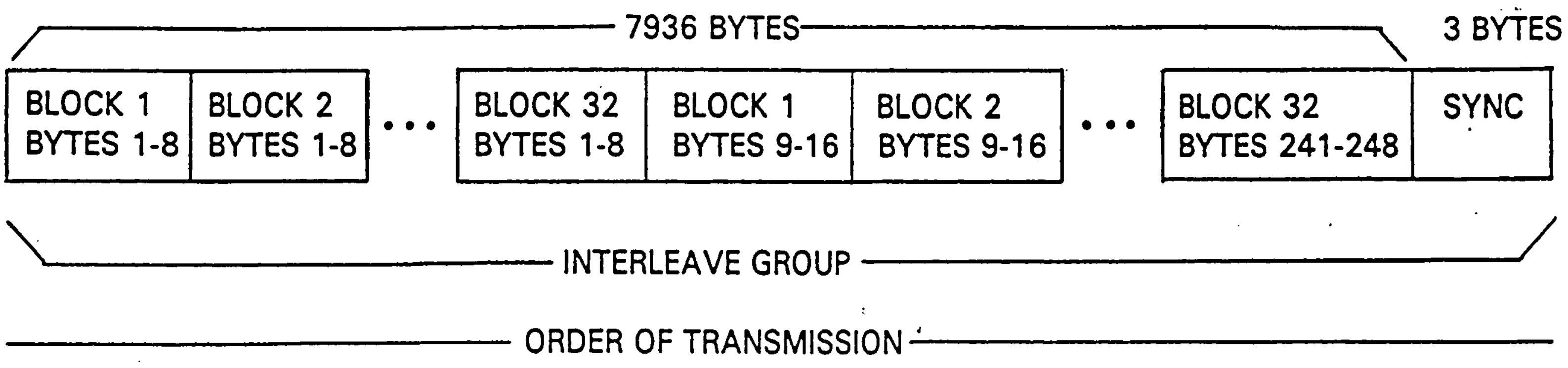

CHECK SYMBOLS
DATA
20 BYTES
228 BYTES
REED-SOLOMON FEC BLOCK
ORDER OF TRANSMISSION

FIG. 4E



The checksum data uses T = 10 RS code characterized by the generator polynomial:

$$G(x) = (x + a^{120})(x + a^{121})(x + a^{122})(x + a^{123})$$
$$(x + a^{124})(x + a^{125})(x + a^{126})(x + a^{127})$$
$$(x + a^{128})(x + a^{129})(x + a^{130})(x + a^{131})$$
$$(x + a^{132})(x + a^{133})(x + a^{134})(x + a^{135})$$
$$(x + a^{136})(x + a^{137})(x + a^{138})(x + a^{139})$$

using the primitive polynomial:

$$P(x) = x^8 + x^7 + x^2 + x + 1$$

and the primitive element $a = x$ (Note a = [alpha])

FIG. 4F

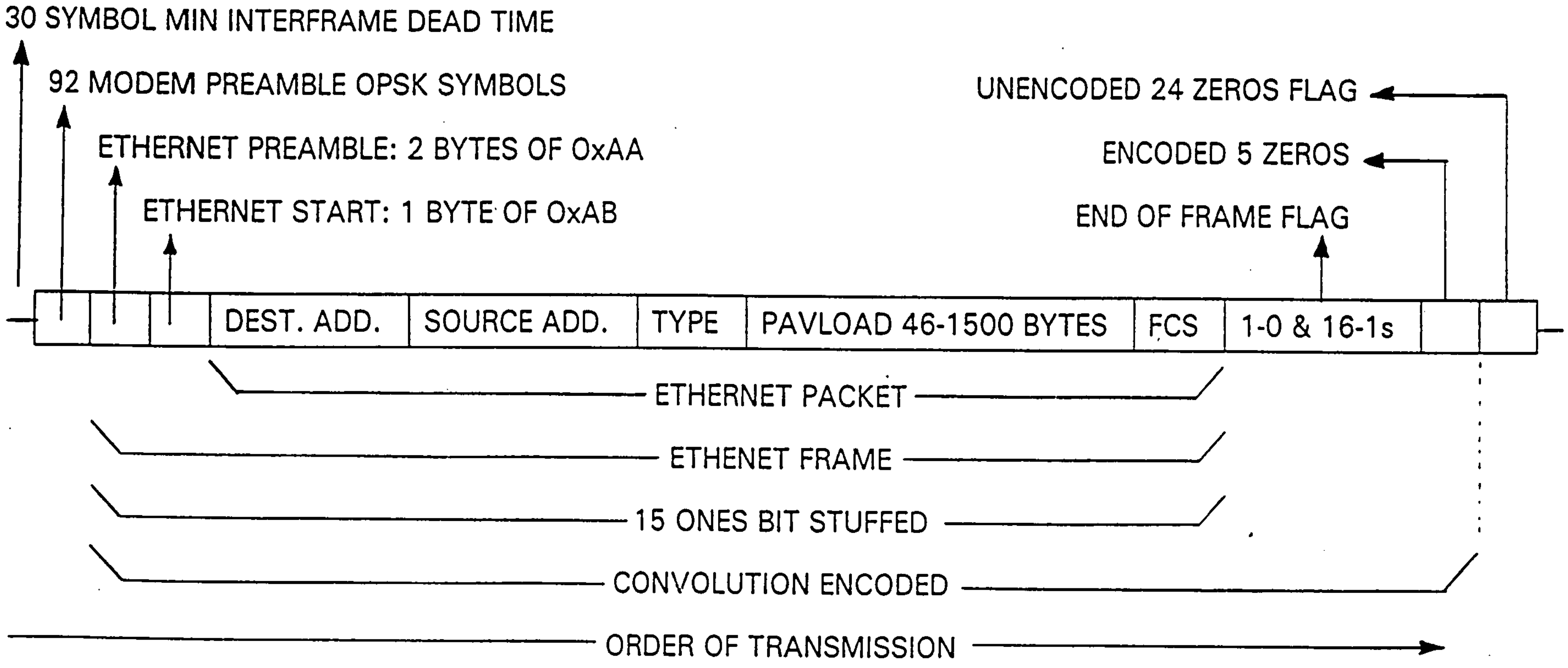

30 SYMBOL MIN INTERFRAME DEAD TIME
92 MODEM PREAMBLE OPSK SYMBOLS
ETHERNET PREAMBLE: 2 BYTES OF OxAA
ETHERNET START: 1 BYTE OF OxAB
UNENCODED 24 ZEROS FLAG
ENCODED 5 ZEROS
END OF FRAME FLAG
DEST. ADD.
SOURCE ADD.
TYPE
PAVLOAD 46-1500 BYTES
FCS
1-0 & 16-1s
ETHERNET PACKET
ETHENET FRAME
15 ONES BIT STUFFED
CONVOLUTION ENCODED
ORDER OF TRANSMISSION

FIG. 4G

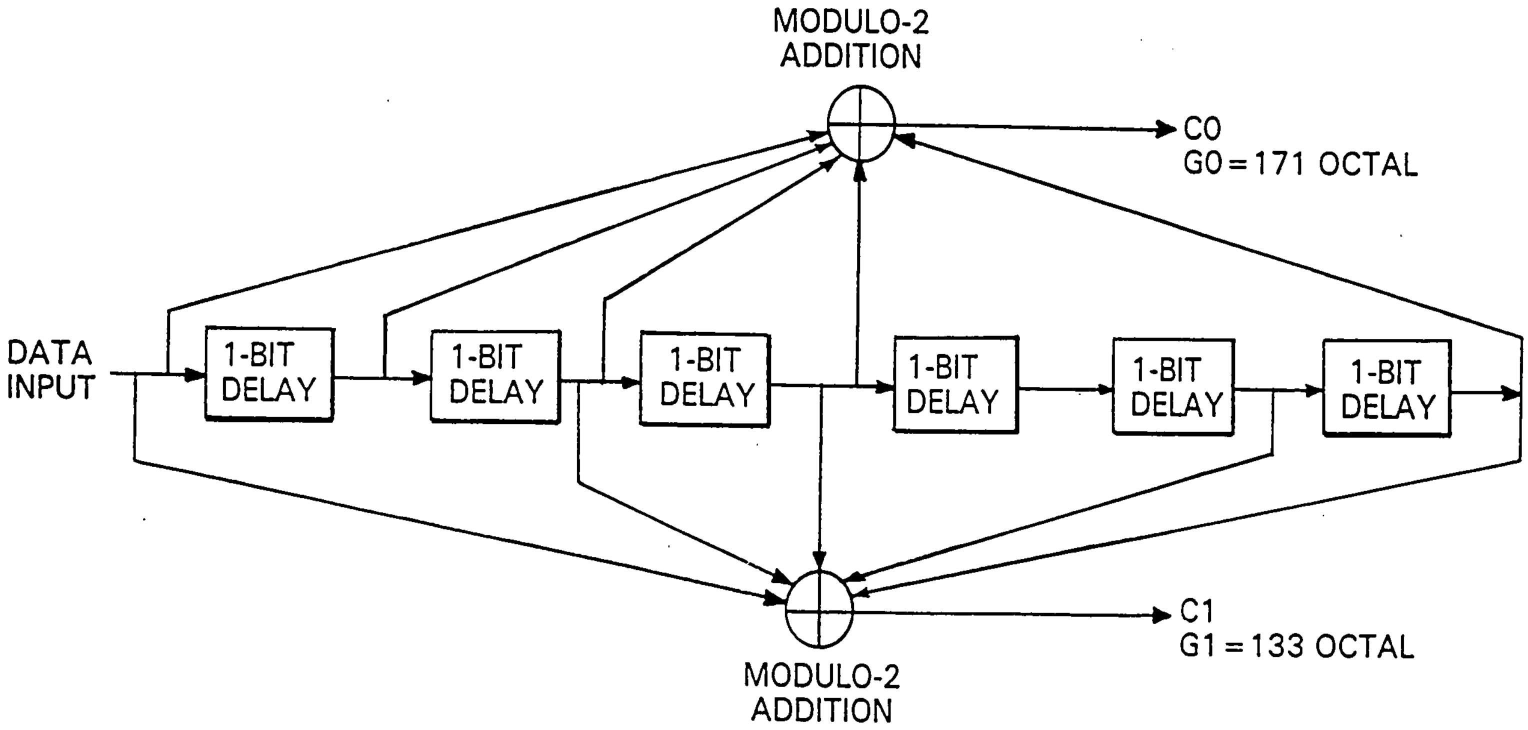


FIG. 4H

C0(1)	< C0(2) >	C0(3)	C0(4)	< C0(5) >	C0(6)
C1(1)	C1(2)	< C1(3) >	C1(4)	C1(5)	< C1(6) >

3/4 PUNCTURED CODING SYSTEM SHOWING THE CODES TRANSMITTED Cx(n) AND THE CODES DELETED < Cx(n) >

FIG. 4I

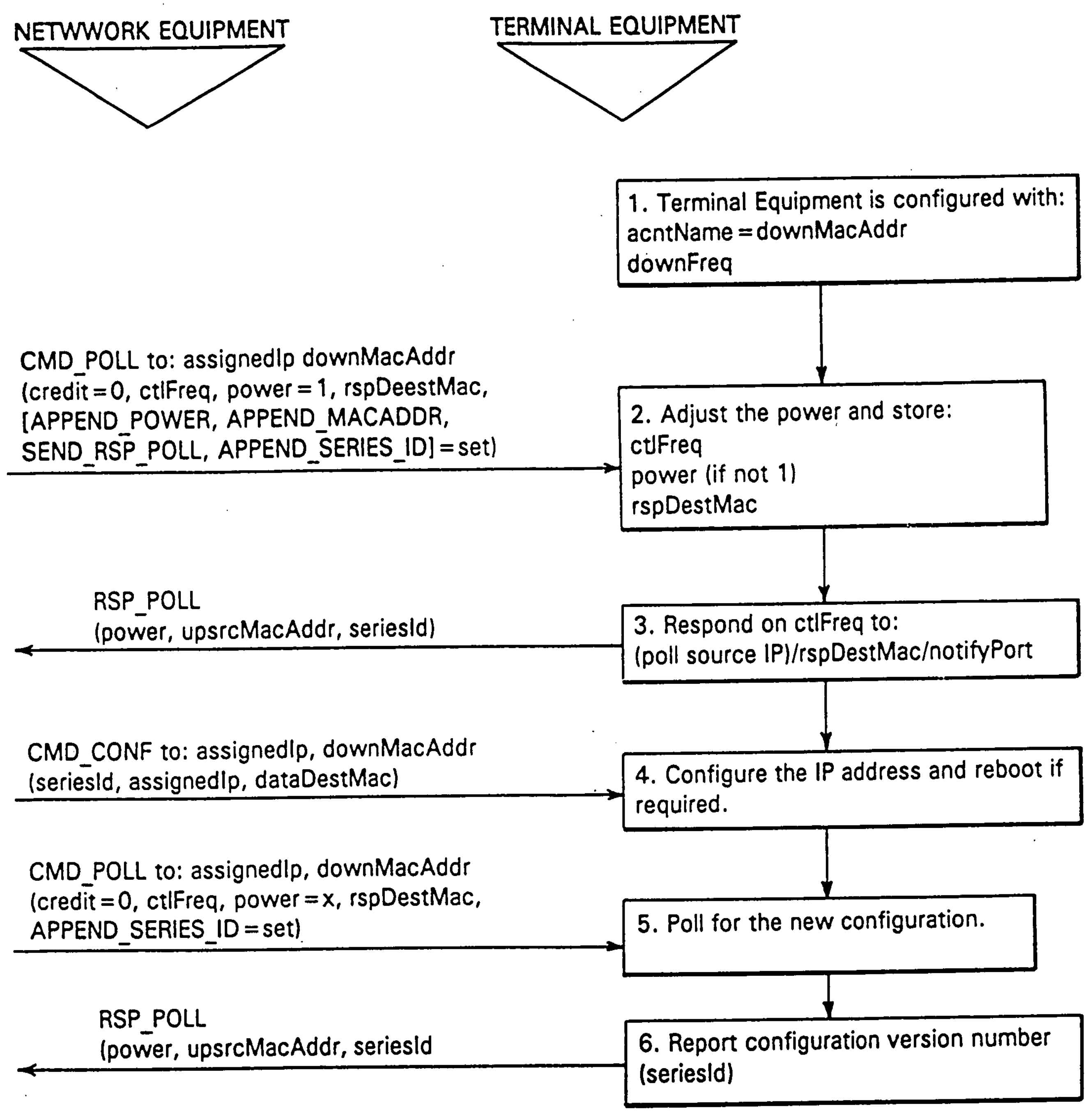

NETWWORK EQUIPMENT
TERMINAL EQUIPMENT
1. Terminal Equipment is configured with:
acntName = downMacAddr
downFreq
CMD_POLL to: assignedIp downMacAddr
(credit = 0, ctlFreq, power = 1, rspDeestMac,
[APPEND_POWER, APPEND_MACADDR,
SEND_RSP_POLL, APPEND_SERIES_ID] = set)
2. Adjust the power and store:
ctlFreq
power (if not 1)
rspDestMac
RSP_POLL
(power, upsrcMacAddr, seriesId)
3. Respond on ctlFreq to:
(poll source IP)/rspDestMac/notifyPort
CMD_CONF to: assignedIp, downMacAddr
(seriesId, assignedIp, dataDestMac)
4. Configure the IP address and reboot if required.
CMD_POLL to: assignedIp, downMacAddr
(credit = 0, ctlFreq, power = x, rspDestMac,
APPEND_SERIES_ID = set)
5. Poll for the new configuration.
RSP_POLL
(power, upsrcMacAddr, seriesId
6. Report configuration version number
(seriesId)

FIG. 5